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CANDIDATE MOTHPROOFERS:

**Toxicity to Fabric Insects
and Persistence Through
Washing and Drycleaning**

Part II

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

PREFACE

This publication reports the results of a series of tests of various compounds that were thought to have potential as mothproofers. Such tests are continuing, and further results will be published at intervals. The study upon which the report was based is part of a broad program of research on methods of protecting fabrics and materials in storage from insect damage. Those compounds that continue to show promise in the screening tests will be tested further.

Trade names are used in this publication solely for the purpose of providing specific identification of the compounds tested. Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture or an endorsement over other products not mentioned.

The chemical names in this report are according to the *Chemical Abstracts* system of nomenclature. Mrs. E. M. Osborne of the Pesticide Chemicals Research Branch, Entomology Research Division, Agricultural Research Service, verified the nomenclature of the compounds.

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This publication reports research involving pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate State and Federal agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

Candidate Mothproofers: Toxicity to Fabric Insects and Persistence Through Washing and Drycleaning

Part II

By

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SUMMARY

In standard Chemical Specialties Manufacturers Association (CSMA) 14-day mothproofing tests, 101 compounds were investigated as potential mothproofers. The compounds were applied to the cloth at 0.5 and 3 percent by weight. The test insects were larvae of the black carpet beetle, *Attagenus megatoma* (Fabricius). Results were evaluated according to excrement weight. Cloths treated with 44 compounds were satisfactorily protected in pre-

cleaning tests on the basis of all requirements of the test method. Cloths treated with 10 of these compounds at both calculated deposit levels and with 19 compounds at the 3 percent by weight rate of application were also satisfactorily protected after one washing. Cloths treated at both calculated deposit levels with 13 compounds and with five compounds at the higher calculated deposit level were satisfactorily protected after one drycleaning.

INTRODUCTION

Inexpensive and safe mothproofers to protect against such damage are urgently needed. In support of this need, the Agricultural Research Service conducts a continuing program at Savannah, Ga., to determine the effectiveness of candidate compounds in protecting wool, mohair, animal hair, and feathers against fabric-insect damage. The persistence of the

effectiveness of these compounds through washings and drycleanings is also determined. The compounds found most promising in these preliminary tests are selected for further research as mothproofers when applied under conditions simulating practical home and industrial treatments.

PROCEDURE

Moth test cloth (100-percent wool), considered the standard test fabric by the American Association of Textile Chemists and Colorists and the Chemical Specialties Manufacturers Association, was used exclusively as the test fabric. Samples of cloth, measuring 3 by 4 inches, were impregnated with the test compounds at calculated deposit levels of 0.5 and

3 percent by weight of the cloth. The compounds were formulated as either methyl alcohol or acetone solutions. After treatment, the cloths were thoroughly aired for 3 days to remove volatile constituents. The treated cloths were then cut into 1- by 2-inch pieces and subjected to biological evaluation.

The biological mothproofing evaluations were conducted in accordance with the CSMA excrement weight test method.¹ Each treated cloth was exposed individually in a petri dish to 10 larvae of the black carpet beetle, *Attagenus megatoma* (Fabricius), for the prescribed 14-day test period. In such an exposure, the insects had the choice of staying on or off the treated cloth. The test insects were 10 to 12 weeks old and weighed 6 to 7 milligrams each. One series of samples (four 1- by 2-inch pieces of cloth) was used from each deposit level. The petri dishes with the insects and test cloth were kept in a darkened cabinet in a room held at a constant temperature of $80^{\circ} \pm 2^{\circ}$ F. and 60 ± 5 percent relative humidity.

If the treated cloths showed resistance to insect feeding in the initial tests, an additional series of samples from the same treatment was washed once and another series drycleaned once to determine the resistance of the treatments to cleansing. These samples were then exposed to the test insects in the same manner as described for the initial tests. All cleansings were done in a Launder-Ometer, the standard laboratory machine specified by the American Association of Textile Chemists and Colorists

for washing and drycleaning tests. The test samples were washed for 30 minutes at 100° F. in a solution of 5 grams of neutral soap per liter of water with a water-to-fabric ratio of 30 : 1 (weight to weight). After being washed, the materials were squeezed by hand, and then given a 10-minute rinse at 80° F. using the same water-to-fabric ratio as in the washing. The drycleaning process consisted of placing two pieces of the treated fabric, 1 by 2 inches, in 50 milliliters of Stoddard solvent and agitating them for 20 minutes at 90° F. The excess solvent was squeezed out by hand and the cloth laid on a horizontal screen to dry at room temperature. When dry, the fabric was pressed with a steam iron and allowed to stand for another day before being tested.

The results were evaluated according to excrement weight and the treated cloth was considered to be satisfactorily resistant to carpet beetle feeding if (1) not more than 5 milligrams of excrement was deposited by the 10 larvae provided that (2) under the same conditions not less than 15 milligrams of excrement was deposited by the 10 larvae on the control specimens.

RESULTS

Results with cloths treated with the 101 compounds identified on pages 6 and 7 are summarized in tables 1, 2, and 3. Cloths treated with 44 of the compounds at one or both of the calculated deposit levels (0.5 and 3 percent by weight of the cloth) were satisfactorily protected before cleansing in accordance with all criteria established for the CSMA 14-day mothproofing test (tables 1 and 2). Cloths treated with 10 of the 44 compounds at both calculated deposit levels and with 19 compounds at the higher deposit level were satisfactorily protected after one washing. Cloths treated at both calculated deposit levels with 13 compounds and with five compounds at the higher calculated deposit level were satisfactorily protected after

one drycleaning. Cloths treated at one or both calculated deposit levels with 18 compounds were satisfactorily protected after one washing and one drycleaning. Fifteen compounds obtained their effectiveness by action other than toxicity.

Cloths treated with 11 compounds at both rates of application were satisfactorily protected from black carpet beetle larval feeding on the basis of all requirements of the 14-day CSMA test except for the feeding requirement on untreated control specimens (table 3).

Cloths treated with the remaining 46 compounds failed to meet any of the CSMA test criteria.

This laboratory will continue to publish supplementary reports of the results of the program on the preliminary evaluation of experimental compounds as mothproofers.

¹ CHEMICAL SPECIALTIES MANUFACTURERS ASSOCIATION. TEXTILE RESISTANCE TEST. Soap and Chemical Specialties Blue Book 45(4A): 197-200. 1969.

TABLE 1.—*Effectiveness of 40 candidate mothproofing compounds (with ENT No.) in protecting woolen cloths from black carpet beetle larvae in standard CSMA tests*¹

Item and ENT No. of candidate compound ²	Calculated deposit by weight of cloth	Resistance of test cloths to larval feeding ³			Larval mortality		
		Before cleansing	After 1 washing	After 1 drycleaning	Before cleansing	After 1 washing	After 1 drycleaning
	<i>Pct.</i>				<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>
Item 51, ENT-8523	0.5	U	U	U	0	0	0
	3.0	S	U	U	8	0	0
Item 29, ENT-16275 .....	.5	S	U	U	35	0	0
	3.0	S	S	U	33	0	10
Item 82, ENT-17591 .....	.5	U	U	U	0	0	0
	3.0	S	U	U	0	0	0
Item 16, ENT-18065 .....	.5	S	U	U	0	0	0
	3.0	S	S	U	0	0	0
Item 79, ENT-22784 .....	.5	S	U	U	0	0	0
	3.0	S	S	U	0	0	0
Item 45, ENT-23393 .....	.5	U	U	U	0	0	0
	3.0	S	S	U	40	28	0
Item 93, ENT-24979 .....	.5	S	U	U	13	0	0
	3.0	S	S	S	33	0	0
Item 77, ENT-25715 .....	.5	S	S	S	93	55	90
	3.0	S	S	S	98	93	100
Item 11, ENT-25718 .....	.5	S	S	U	0	0	0
	3.0	S	S	S	0	0	0
Item 43, ENT-25719 .....	.5	S	U	U	10	0	0
	3.0	S	U	U	18	3	3
Item 55, ENT-25733 .....	.5	S	S	S	93	20	73
	3.0	S	S	S	93	85	78
Item 65, ENT-25737 .....	.5	S	U	S	63	0	73
	3.0	S	S	S	75	60	90
Item 76, ENT-25923 .....	.5	S	U	U	40	0	0
	3.0	S	S	U	53	63	63
Item 63, ENT-27018 .....	.5	S	U	U	58	0	8
	3.0	S	S	S	70	58	73
Item 60, ENT-27019 .....	.5	S	U	S	93	8	85
	3.0	S	S	S	100	85	93
Item 68, ENT-27162 .....	.5	S	U	U	45	10	30
	3.0	S	S	S	43	58	65
Item 75, ENT-27165 .....	.5	S	---	---	13	---	---
	3.0	S	---	---	65	---	---
Item 89, ENT-27226 .....	.5	U	---	---	0	---	---
	3.0	S	---	---	0	---	---
Item 39, ENT-27254 .....	.5	S	---	---	0	---	---
	3.0	S	---	---	0	---	---
Item 19, ENT-27262 .....	.5	S	U	U	68	0	0
	3.0	S	U	U	73	0	50
Item 1, ENT-27323 .....	.5	S	U	U	0	0	0
	3.0	S	U	U	10	0	0
Item 78, ENT-27326 .....	.5	S	S	S	53	43	80
	3.0	S	S	S	43	93	93
Item 30, ENT-27339 .....	.5	S	---	---	0	---	---
	3.0	S	---	---	18	---	---
Item 25, ENT-27352 .....	.5	U	U	U	15	0	0
	3.0	S	U	U	35	0	0
Item 27, ENT-27391 .....	.5	S	U	U	0	0	0
	3.0	S	S	U	0	0	0
Item 71, ENT-27408 .....	.5	S	S	S	75	73	85
	3.0	S	S	S	85	88	80

See footnotes at end of table.

TABLE 1.—*Effectiveness of 40 candidate mothproofing compounds (with ENT No.) in protecting woolen cloths from black carpet beetle larvae in standard CSMA tests*¹—Continued

Item and ENT No. of candidate compound ²	Calculated deposit by weight of cloth	Resistance of test cloths to larval feeding ³			Larval mortality		
		Before cleansing	After 1 washing	After 1 drycleaning	Before cleansing	After 1 washing	After 1 drycleaning
	<i>Pct.</i>				<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>
Item 38, ENT-27426	0.5	U	....	....	0	....	....
	3.0	S	....	....	0	....	....
Item 67, ENT-27445 .....	.5	S	U	S	85	5	83
	3.0	S	S	S	90	83	90
Item 74, ENT-27448 .....	.5	S	S	S	63	68	73
	3.0	S	S	S	70	65	75
Item 72, ENT-27449 .....	.5	S	S	S	68	65	55
	3.0	S	S	S	73	60	58
Item 22, ENT-27460 .....	.5	U	....	....	0	....	....
	3.0	S	....	....	15	....	....
Item 73, ENT-27469 .....	.5	S	S	S	65	55	83
	3.0	S	S	S	85	75	98
Item 28, ENT-27474 .....	.5	S	U	U	10	0	0
	3.0	S	S	U	0	0	0
Item 41, ENT-27512 .....	.5	S	U	U	0	0	0
	3.0	S	S	S	0	3	0
Item 40, ENT-27563 .....	.5	S	U	U	0	0	0
	3.0	S	S	U	0	0	0
Item 69, ENT-27607 .....	.5	S	S	S	38	75	43
	3.0	S	S	S	50	75	65
Item 70, ENT-27608 .....	.5	S	S	S	55	58	68
	3.0	S	S	S	58	68	78
Item 64, ENT-27626	0.5	S	U	U	43	0	0
	3.0	S	U	U	55	0	5
Item 92, ENT-28450 .....	.5	S	U	S	23	0	3
	3.0	S	S	S	75	0	8
Item 53, ENT-50518 .....	.5	U	....	....	0	....	....
	3.0	S	....	....	0	....	....

¹ The Chemical Specialties Manufacturers Association (CSMA) provided the 14-day mothproofing test procedure.² Chemical names of the test compounds are listed by item and entomology (ENT) No. in the appendix, p. 6.³ S = Satisfactory, resistant to carpet beetle larval feeding according to all CSMA test criteria; U = Unsatisfactory, not resistant.TABLE 2.—*Effectiveness of 4 candidate mothproofing compounds (without ENT No.) in protecting woolen cloths from black carpet beetle larvae in standard CSMA tests*¹

Item No. of candidate compound ²	Calculated deposit by weight of cloth	Resistance of test cloths to larval feeding ³			Larval mortality		
		Before cleansing	After 1 washing	After 1 drycleaning	Before cleansing	After 1 washing	After 1 drycleaning
	<i>Pct.</i>				<i>Pct.</i>	<i>Pct.</i>	<i>Pct.</i>
Item 84	0.5	U	U	U	0	0	0
	3.0	S	U	U	0	0	0
Item 85 .....	.5	U	....	....	0	....	....
	3.0	S	S	U	0	0	0
Item 86 .....	.5	U	....	....	0	....	....
	3.0	S	S	U	0	0	0
Item 87 .....	.5	U	U	U	0	0	0
	3.0	S	S	U	0	0	0

¹ The Chemical Specialties Manufacturers Association (CSMA) provided the 14-day mothproofing test procedure.² Chemical names of the test compounds are listed by item No. in the appendix, p. 6.³ S = Satisfactory, resistant to carpet beetle larval feeding according to all test criteria; U = Unsatisfactory, not resistant.

TABLE 3.—*Mortality among black carpet beetle larvae exposed to cloths treated with 11 candidate mothproofing compounds in standard CSMA tests*¹

Item and ENT No. of candidate compound ²	Calcu- lated deposit by weight of cloth	Larval mortality		
		Before cleans- ing ³	After 1 wash- ing	After 1 dry- cleaning
Item 56, ENT-25785....	<i>Pct.</i> 0.5	<i>Pct.</i> 70	<i>Pct.</i> 0	<i>Pct.</i> 18
	3.0	88	33	38
Item 59, ENT-25786....	.5	45	30	53
	3.0	68	65	60
Item 58, ENT-25787....	.5	23	0	0
	3.0	33	10	18
Item 57, ENT-25789....	.5	88	0	0
	3.0	100	10	0
Item 32, ENT-25791....	.5	0	0	0
	3.0	0	0	0
Item 61, ENT-25818....	.5	28	0	55
	3.0	75	15	83
Item 62, ENT-25841....	.5	78	3	35
	3.0	95	83	88
Item 14, ENT-27136....	.5	0	0	0
	3.0	0	0	0
Item 13, ENT-27137....	.5	0	0	0
	3.0	0	0	0
Item 15, ENT-27139....	.5	15	0	0
	3.0	5	3	3
Item 80, ENT-27260....	.5	5	0	0
	3.0	30	0	0

¹ The Chemical Specialties Manufacturers Association (CSMA) provided the 14-day mothproofing test procedure.

² The chemical names of the test compounds are listed by item and entomology (ENT) No. in the appendix, p. 6.

³ Satisfactorily protected cloths before cleansing in accordance with all CSMA test criteria except one: larval excrement on untreated controls measured less than the 1.5 mg. per larva specified.

APPENDIX

Compounds Evaluated As Potential Mothproofers

Item No.	ENT No.	Chemical name	Item No.	ENT No.	Chemical name
1	27323	Acetimidoyl chloride, 2,2,2-trichloro- <i>N</i> -(pentachlorophenyl)-	28	27474	Cyclopropanecarboxylic acid, 2,2-dimethyl-3-(2-methylpropenyl)-, (5-benzyl-3-furyl) methyl ester, <i>cis-trans</i> -(±)-
2	27546	<i>o</i> -Anisimidic acid, 3,6-dichloro- <i>N</i> -ethoxy-, anhydride with benzoic acid	29	16275	Cyclopropanecarboxylic acid, 2,2-dimethyl-3-(2-methylpropenyl)-, ester with 2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one, <i>trans</i> -(±)-
3	27545	<i>o</i> -Anisimidic acid, 3,6-dichloro- <i>N</i> -ethoxy-, anhydride with p-toluic acid	30	27339	Cyclopropanecarboxylic acid, 2,2-dimethyl-3-(2-methylpropenyl)-, ester with <i>N</i> -(hydroxymethyl)-1-cyclohexene-1,2-dicarboximide
4	26459	Benzenesulfonamide, <i>N,N</i> -dibutyl-	31	27340	Disulfide, bis(diethylthiocarbamoyl)
5	27552	Benzilic acid, 4,4'-dibromo-, isopropyl ester	32	25791	2-Dodecanone, polychlorinated
6	26999	Benzilic acid, 4,4'-dichloro-, isopropyl ester	33	24828	Ethanol, 2-(octylthio)-
7	.....	2-Benzothiazolethiol, 5-chloro-, zinc salt	34	28708	Ether, 4-chloro-2-nitrophenyl 2-propynyl
8	28688	1,2,3-Benzotriazin-4 (3 <i>H</i>)-one, 3-allyl-6-chloro-	35	28709	Ether, 2-propynyl 2,4,5-trichlorophenyl
9	28678	1,2,3-Benzotriazin-4 (3 <i>H</i>)-one, 3-allyl-7-chloro-	36	.....	Hypochlorous acid, benzyl ester
10	28681	1,2,3-Benzotriazin-4 (3 <i>H</i>)-one, 3-butyl-6-chloro-	37	24703	Imidazole
11	25718	Bi-2,4-cyclopentadien-1-yl, decachloro-	38	27426	Imidazolium, 1,3-didodecyl-3-methyl-bromide
12	36	Biphenyl	39	27254	Methanesulfonamide, <i>N</i> -(<i>p</i> -chlorophenyl)- <i>N</i> -[(1,1,2,2-tetrachloro-2-fluoroethyl)-thio]-
13	27137	3-Biphenylcarboxanilide, 2",4",5,5"-tetrachloro-2-hydroxy-	40	27563	Methanesulfonanilide, 4'-bromo- <i>N</i> -[(1,1,2,2-tetrachloro-2-fluoroethyl) thio]-
14	27136	3-Biphenylcarboxanilide, 3",4",5-trichloro-2-hydroxy-	41	27512	Methanesulfonanilide, <i>N</i> -[(1,1,2,2-tetrachloro-2-fluoroethyl) thio]-
15	27139	3-Biphenylcarboxanilide, 4',4",5-tetrachloro-2-hydroxy-	42	27538	<i>p</i> -Methan-2-one
16	18065	Butane, 1,1-bis(<i>p</i> -chlorophenyl)-2-nitro-	43	25719	1,3,4-Metheno-1 <i>H</i> -cyclobuta[<i>cd</i>]-pentalene, dodecachlorooctahydro-
17	8286	Butoxy polypropylene glycol	44	24292	1,4-Naphthoquinone
18	27264	Carbamic acid, acetylmethyl-, <i>m</i> - <i>tert</i> -butylphenyl ester	45	23393	2-Norbornene, 5-(bromoethyl)-1,2,3,4,7,7-hexachloro-
19	27262	Carbamic acid, acetylmethyl-, 6-chloro-3,4-xylyl ester	46	27535	2,4-Pentanediol, cyclic sulfite, <i>meso</i> -
20	27456	Carbamic acid, (chloroacetyl) methyl-, <i>m</i> -tolyl ester	47	28658	Peroxy carbamic acid, diethyltrithio-, <i>tert</i> -butyl ester
21	14689	Carbamic acid, dimethyldithio-, ferric salt	48	28662	Peroxy carbamic acid, diethyltrithio-, ethyl ester
22	27460	Carbamic acid, (mercaptoacetyl) methyl-, <i>o</i> -tolyl ester, <i>S</i> -ester with <i>O,O</i> -dimethyl phosphorodithioate	49	25031	Peroxy carbamic acid, dimethyltrithio-, <i>tert</i> -butyl ester
23	27480	Carbamic acid, methyl-, ester with 4'-hydroxyacetanilide	50	28659	Peroxy carbamic acid, dipropyltrithio-, <i>tert</i> -butyl ester
24	27481	Carbamic acid, methyl-, ester with 3'-hydroxypropionanilide	51	8523	Phenol, 2-benzyl-4-chloro-
25	27352	Carbamic acid, methyl(phenoxyacetyl)-, <i>m-sec</i> -butylphenyl ester	52	2730	Phenol, 2,2'-methylenebis[4-chloro-
26	14693	Copper, bis(dimethyldithiocarbamate)-	53	50518	Phenol, 2,2'-thiobis[4,6-dichloro-
27	27391	Cyclopropane, 1,1-dichloro-2,2-bis(<i>p</i> -ethoxyphenyl)-			

<i>Item No.</i>	<i>ENT No.</i>	<i>Chemical name</i>	<i>Item No.</i>	<i>ENT No.</i>	<i>Chemical name</i>
54	.....	Phenol, 2,2'-thiobis[4,6-dichloro-, zinc salt			dichloro-phenyl) glyoxylonitrile oxime, <i>beta</i> -isomer
55	25733	Phosphonothioic acid, ethyl-, <i>O</i> -ethyl <i>O</i> -[2-(ethylthio)-6-methyl-4-pyrimidinyl] ester	74	27448	Phosphorothioic acid, <i>O,O</i> -diethyl ester, <i>O</i> -ester with phenylglyoxylonitrile oxime
56	25785	Phosphonothioic acid, methyl-, <i>O</i> -(2-chloroallyl) <i>O</i> -(<i>p</i> -nitrophenyl) ester	75	27165	Phosphorothioic acid, <i>O,O</i> -dimethyl ester, <i>O,O</i> -diester with 4,4'-thiodiphenol
57	25789	Phosphonothioic acid, methyl-, <i>O</i> -(2-chloroallyl) <i>O</i> -(<i>alpha,alpha</i> , <i>alpha</i> -trifluoro-4-nitro- <i>m</i> -tolyl)-ester	76	25923	Phosphorothioic acid, <i>O,O</i> -dimethyl <i>O</i> -(<i>m</i> -nitrophenyl) ester
58	25787	Phosphonothioic acid, methyl-, <i>O</i> -(<i>p</i> -nitrophenyl) <i>O</i> -phenyl ester	77	25715	Phosphorothioic acid, <i>O,O</i> -dimethyl <i>O</i> -(4-nitro- <i>m</i> -tolyl) ester
59	25786	Phosphonothioic acid, methyl-, <i>O</i> -(<i>p</i> -nitrophenyl) <i>O</i> -propyl ester	78	27326	Phosphorothioic acid, <i>O</i> -[3-(isopropylthio)-4-nitrophenyl] <i>O</i> , <i>O</i> -dimethyl ester
60	27019	Phosphoric acid, 1-(2-bromo-4,5-dichlorophenyl)-2-chlorovinyl dimethyl ester	79	22784	Propane, 1,1-bis(<i>p</i> -chlorophenyl)-2-nitro-
61	25818	Phosphoric acid, 2-chloro-1-(2,4-dichlorophenyl) vinyl dimethyl ester	80	27260	1-Propanethiol, 3-(tributylstannyl)-, acetate
62	25841	Phosphoric acid, 2-chloro-1-(2,4,5-trichlorophenyl) vinyl dimethyl ester	81	9	2 <i>H</i> -Pyran-6-carboxylic acid, 3,4-dihydro-2,2-dimethyl-4-oxo-, butyl ester
63	27018	Phosphoric acid, 2-chloro-1-(2,5-dichlorophenyl) vinyl dimethyl ester	82	17591	Pyridine-2,5-dicarboxylic acid, dipropyl ester
64	27626	Phosphoric acid, diethyl ester, ester with <i>o</i> -tolylglyoxylonitrile oxime	83	27528	Pyridine, 2-(2-methoxyethoxy)-
65	25737	Phosphorodithioic acid, <i>S</i> -(4,6-dimethyl-2-pyrimidinyl) <i>O,O</i> -diethyl ester	84	.....	Salicylanilide, <i>ar,ar'</i> -dibromo-
66	27482	Phosphorodithioic acid, <i>O,O,S</i> -trimethyl ester	85	.....	Salicylanilide, 4',5-dibromo-, plus 3,4',5-tribromosalicylanilide (1:1 mixture)
67	27445	Phosphorothioic acid, <i>O</i> -1,2,3-benzothiadiazol-6-yl <i>O,O</i> -dimethyl ester	86	.....	Salicylanilide, 3,4,5-tribromo-, plus about 5% 3,5-dibromosalicylanilide
68	27162	Phosphorothioic acid, <i>O</i> -(4-bromo-2,5-dichlorophenyl) <i>O,O</i> -dimethyl ester	87	.....	<i>m</i> -Salicylotoluidide, 3,5-dibromo- <i>alpha,alpha,alpha</i> -trifluoro-
69	27607	Phosphorothioic acid, <i>O</i> -(3-bromo-5,7-dimethylpyrazolo[1,5- <i>a</i>] pyrimidin-2-yl) <i>O,O</i> -diethyl ester	88	27470	Sulfamide, <i>N</i> -[(dichlorofluoromethyl) thio]- <i>N',N'</i> -dimethyl- <i>N-p</i> -tolyl-
70	27608	Phosphorothioic acid, <i>O</i> -(3-chloro-5,7-dimethylpyrazolo[1,5- <i>a</i>]pyrimidin-2-yl) <i>O,O</i> -diethyl ester	89	27226	Sulfurous acid, 2-(<i>p-tert</i> -butylphenoxy)-cyclohexyl 2-propynyl ester
71	27408	Phosphorothioic acid, <i>O</i> -(2,5-dichloro-4-iodophenyl) <i>O,O</i> -dimethyl ester	90	27224	Sulfurous acid, 1-[(<i>p-tert</i> -butylphenoxy)-methyl]-propyl <i>o</i> -tolyl ester
72	27449	Phosphorothioic acid, <i>O,O</i> -diethyl ester, <i>O</i> -ester with (<i>o</i> -chlorophenyl)-glyoxylonitrile oxime	91	27225	Sulfurous acid, 1-[(<i>p-tert</i> -pentylphenoxy)methyl]propyl 2-propynyl ester
73	27469	Phosphorothioic acid, <i>O,O</i> -diethyl ester, <i>O</i> -ester with (2,6-	92	28450	Tin, chlorotripentyl-
			93	24979	Tin, oxybis[tributyl-
			94	18145	Tin, tetrapropyl-
			95	20218	<i>m</i> -Toluidine, <i>N,N</i> -diethyl-
			96	7422	<i>m</i> -Toluidine, <i>alpha,alpha,alpha</i> -trifluoro-
			97	8632	3,5-Xylenol, 4-chloro-
			98	.....	Zinc, bis(butyldithiocarbamato)-
			99	.....	Zinc, bis(diallyldithiocarbamato)-
			100	Zinc, bis(ethyldithiocarbamato)-
			101	Zinc, bis(methyldithiocarbamato)-

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<i>ENT No.</i>	<i>Commercial or common name</i>	<i>Item. No.</i>	<i>ENT No.</i>	<i>Commercial or common name</i>	<i>Item. No.</i>
9	Indalone	81	27260	Stauffer N-4372	80
36		12	27262	Upjohn U-12379	19
2730	Preventol GD	52	27264	Upjohn U-24157	18
	dichlorophene		27323	Vero Beach Bay 58733	1
7422	<i>m</i> -Aminobenzotrifluoride	96	27326	Vero Beach Bay 69047	78
8286	Stabilene	17	27339	Neo-pynamin	30
8523	Santophen 1	51		tetramethrin	
8632	Ottasept	97	27340	Du Pont Fungicide 4472	31
14689	ferbam	21	27352	Upjohn U-22024	25
14693		26	27391	Monsanto CP-51543	27
16275	<i>d-trans</i> -allethrin	29	27408	Ciba C-9491	71
17591	MGK Repellent 326	82	27426		38
18065	Bulan	16	27445	Shell SD-15135	67
18145		94	27448	Vero Beach Bay 77488	74
20218	deet	95	27449	Vero Beach Bay 78182	72
22784	Prolan	79	27456	Hercules 16805	20
23393	Bromodan	45	27460	Hercules 17200	22
24292		44	27469	Vero Beach Bay 78755	73
24703		37	27470	Vero Beach Bay 49854	88
24828	MGK Repellent 874	33	27474	Penick SBP-1382	28
24979	tributyltin oxide	93		NRDC 104	
25031	Midwest Research Institute	49	27480	Stauffer R-10534	23
	S-770-8		27481	Stauffer R-11520	24
25715	Sumithion	77	27482	Stauffer R-5910	66
	Accothion		27512	Stauffer R-10044	41
	Bay 41831		27528	Reynolds SAA6A	83
25718	Pentac	11	27535	Reynolds SM-4-G	46
	Hooker HRS-16		27538	Reynolds SM-11-G	42
25719	mirex	43	27545	Velsicol PCS-1301	3
25733	Bayer 44632	55	27546	Velsicol PCS-1302	2
25737	Stauffer R-3413	65	27552	Geigy GS-19851	5
25785	Monsanto CP-40272	56	27563	Stauffer R-11445	40
25786	Monsanto CP-40273	59	27607	Vero Beach Bay 75546	69
25787	Monsanto CP-40294	58	27608	Vero Beach Bay 79845	70
25789	Monsanto CP-40298	57	27626	Vero Beach Bay 88991	64
25791	Armour ARD-170	32	28450	triamyltin chloride	92
25818	Shell SD-8280	61	28658	Midwest Research Institute	47
25841	Gardona	62		S-770-6	
	Shell SD-8447		28659	Midwest Research Institute	50
25923	Vero Beach Bay 45515	76		S-770-10	
26459	WARF anti-resistant	4	28662	Midwest Research Institute	48
26999	chloropropylate	6		S-770-26	
27018	Shell SD-8211	63	28678	Midwest Research Institute	9
27019	Shell SD-8949	60		S-770-109	
27136	Monsanto CP-42366	14	28681	Midwest Research Institute	10
27137	Monsanto CP-42527	13		S-770-122	
27139	Monsanto CP-43858	15	28688	Midwest Research Institute	8
27162	bromophos	68		S-770-116	
27165	Abate	75	28708	Hoffman-LaRoche RO 5-1557	34
27224	Naugatuck C-940	90	28709	Hoffman-LaRoche RO 5-8019	35
27225	Naugatuck C-912	91	50518	Vancide BL	53
27226	Naugatuck D-014	89			
27254	Stauffer R-10043	39			

Index To Compounds Without ENT Numbers

<i>Name</i>	<i>Item No.</i>	<i>Name</i>	<i>Item No.</i>
2-Benzothiazolethiol, 5-chloro-, zinc salt	7	Salicylanilide, 3,4',5-tribromo-, plus about	86
Hypochlorous acid, benzyl ester	36	5% 3,5-dibromosalicylanilide	
Phenol, 2,2'-thiobis[4,6-dichloro-, zinc salt	54	<i>m</i> -Salicylotoluidide, 3,5-dibromo-	87
Salicylanilide, <i>ar</i> , <i>ar'</i> -dibromo-	84	<i>alpha,alpha,alpha</i> -trifluoro-	
Salicylanide, 4'5-dibromo-, plus 3,4',5-	85	Zinc, bis (butyldithiocarbamato)-	98
tribromosalicylanilide		Zinc, bis (diallyldithiocarbamato)-	99
(1:1 mixture)		Zinc, bis (ethyldithiocarbamato)-	100
		Zinc, bis (methyldithiocarbamato)-	101

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